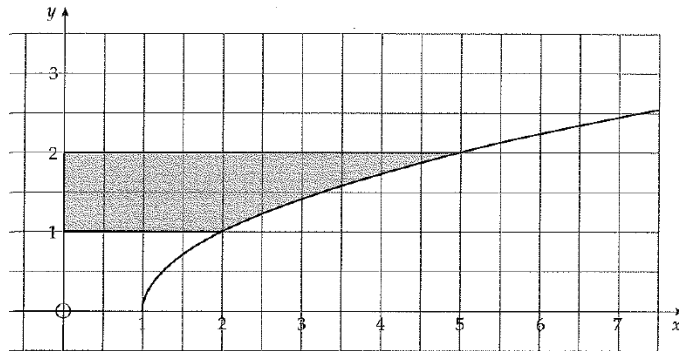


AREA BETWEEN A CURVE AND THE Y-AXIS

Rule: The area between a curve $f(y)$ and the y -axis from the interval $y = a$ to $y = b$ is

$A = \int_a^b f(y) dy$. If the function of the curve is given in terms of x , then rearrange to make x the subject.

Example 1: Find the area shaded below for the function $y = \sqrt{x-1}$.



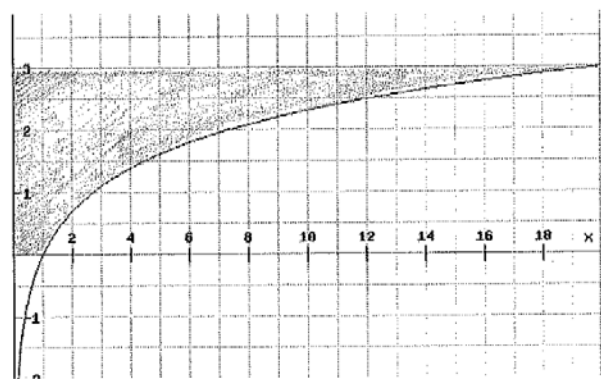
$$y = \sqrt{x-1} \rightarrow y^2 = x-1 \rightarrow x = y^2 + 1 \quad \therefore f(y) = y^2 + 1$$

$$A = \int_a^b f(y) dy = \int_1^2 y^2 + 1 dy$$

$$= \left[\frac{y^3}{3} + y \right]_1^2$$

$$= 3\frac{1}{3} \text{ units}^2$$

Example 2: Find the area between the curve $y = \ln(x)$, the y -axis, and the lines $y = 0$ and $y = 3$.



$$y = \ln(x) \rightarrow x = e^y \quad \therefore f(y) = e^y$$

$$A = \int_0^3 e^y dy$$

$$= [e^y]_0^3$$

$$= 19.09 \text{ units}^2 \text{ (2dp)}$$